THE MUNICIPALITY OF METROPOLITAN TORONTO

SWEAP

SOLID WASTE ENVIRONMENTAL ASSESSMENT PLAN

Component 3: TECHNOLOGY EVALUATION

Discussion Paper No: 3.5C

Title: SITE SELECTION PROCESS ENERGY FROM WASTE (EFW)

Date: SEPTEMBER, 1990

DEPARTMENT OF WORKS
SOLID WASTE MANAGEMENT DIVISION

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THE MUNICIPALITY OF METROPOLITAN TORONTO
SOLID WASTE ENVIRONMENTAL ASSESSMENT PLAN
COMPONENT 3: TECHNOLOGY EVALUATION
DISCUSSION PAPER NO. 3.5C
SITE SELECTION PROCESS
ENERGY FROM WASTE (EFW)

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SEPTEMBER 12, 1990

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1.0 INTRODUCTION

Metropolitan Toronto (Metro) began preparing a Solid Waste Environmental Assessment Plan (SWEAP) in 1987 to develop a comprehensive long-term system to deal with all aspects of its domestic, commercial and non-hazardous industrial solid waste, plus any other wastes for which it is responsible under agreements.

Potential solid waste management systems for Metro have been broadly defined and described in a report to Metro Toronto entitled "Towards a Solid Waste Management Master Plan - A Status Report on Metropolitan Toronto's Planning Process", Discussion Paper 7.1, dated January 1990. The alternative waste management systems identified in Discussion Paper 7.1 have, in addition to waste reduction, included central recycling, composting and landfilling. Two of the alternative systems also included incineration with energy recovery.

Should Metro determine to proceed with a waste management system that includes incineration with energy recovery (i.e., energy from waste, EFW) a site selection process for EFW facilities will be required. This report describes the process which will be used to site an EFW facility. Other reports deal with the site selection process for landfill, materials recovery facilities (MRFs) and for composting facilities. * A further report will be published which will deal with the selection of an overall solid waste management system.

The approach described in this report will result in the identification of the preferred EFW facility site. If Metro wishes to proceed with more than one EFW facility, the same approach will be used to identify a second, third and subsequent EFW facility sites.

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* These reports are as follows:

Discussion Paper 2.2: Site Selection Process: Landfill (Revised Approach);
Discussion Paper 3.5A: Site Selection Process: Materials Recovery Facility(MRF);
Discussion Paper 3.5B: Site Selection Process: Composting.

SWEAP Task Force #1 prepared a paper entitled "Site Criteria Issues to be Addressed by SWEAP" (attached as Appendix A), and presented it to Metro in September 1988. The concepts and issues addressed by Task Force #1 are also considered in this Discussion Paper.

A Glossary has been prepared for a number of the terms used in this Paper.

2.0 PURPOSE, GENERAL PREMISES AND GOAL

2.1 Purpose

The purpose of this document is to describe the site selection process for potential EFW facilities for Metro.

2.2 General Premises Guiding the Siting of EFW Facilities for Metro

The following general premises were considered in the development of the EFW site selection process:

- Metro is undertaking a solid waste management master planning process to find an appropriate long-term solution for the management of its domestic, commercial and non-hazardous industrial solid waste, plus any other wastes for which it is responsible under agreements.

- In order to satisfy the requirements of the Environmental Assessment Act, it is necessary to identify a reasonable number of reasonable sites (i.e., alternatives) in the facility site selection process to permit a comparative evaluation of the sites.

- This site selection process should be rational, traceable and defensible. It should be conducted in consultation with the affected public.

- Metro will look first within its own boundaries to site its EFW facilities. Should a municipal proponent or municipal approval of a landfill facility for Metro's wastes outside of Metro's boundaries require that an EFW facility be provided on or adjacent to that facility, Metro considers the location of an EFW facility at that location to be equivalent to locating it within Metro's boundaries.

- The cost of transportation is not considered by Metro to be an exclusionary constraint. Therefore, if a reasonable number of reasonable sites are not identified within Metro, the study area will be expanded to include the

remainder of Ontario. In this event, resort would be had to the Metropolitan Toronto Act (Part V, Section 66(2)), whereby Metro may acquire land, including by expropriation, for disposal of waste anywhere in Ontario. Under this Act, such acquisition must have the permission of the local municipality or, in absence of this, the approval of the Ontario Municipal Board.

- If waste management facilities are to be located outside of Metro, Metro would prefer to locate such facilities where there is a willing landowner or willing municipality (i.e., willing host) provi[illegible]t the criteria that would be applied in a systematic site search of all of Ontario are also satisfied.

2.3 Goal

The goal of the EFW site selection process is to find an EFW site employing an approach that meets the requirements of the Environmental Assessment Act.

3.0 EFW FACILITY SITE SELECTION APPROACH

3.1 Overview of Three-Phase Approach

Metro will first look within its own boundaries for potential sites for EFW facilities. If a reasonable number of reasonable sites (i.e., sites that meet the identified criteria) are not available to permit a comparative evaluation, the study area will be expanded to include the remainder of Ontario on the basis described in the general premises.

Thus, the site selection approach involves the identification of sites through three sequential phases:

Phase 1 - a systematic site search inside Metro;
Phase 2 - a willing host site search in the remainder of Ontario; and
Phase 3 - a systematic site search in the remainder of Ontario.

Within each phase, a series of steps will be followed to identify, through the application of criteria, Candidate Sites and, ultimately, if there are a reasonable number of Candidate Sites, a preferred site. The three-phase approach is illustrated in Figure 1 and the criteria are set out in Tables 1, 2A, 2B and 3.

3.1.1 Phase 1 - Systematic Site Search Inside Metropolitan Toronto

The systematic site search process inside Metro involves the identification of lands within a specific study area (i.e., Metro) that meet defined criteria. In Phase 1, the application of criteria set out in Table 1, to land within Metro, will permit the identification of Candidate Areas in which to locate a site for an EFW facility (i.e., Step 1). The application of criteria, set out in Table 2A, will permit the identification of Candidate Sites within the Candidate Areas (i.e., Step 2). Refer to Figure 1.

As part of the site identification process, Metro will place advertisements in local newspapers which will invite municipalities and landowners within Metro to express their interest in offering to Metro a site or sites for an EFW facility. Landowners may only offer sites they own or control (i.e., no private third parties may offer sites). Where sites are identified in this manner, they must meet the same criteria for identification for Candidate Sites as are noted above (see Table 2A).

If, at the end of Step 2, the systematic site search process has resulted in the identification of a reasonable number, or more, of reasonable sites, then a long list of sites is created. An assessment of this long list would then be conducted using criteria set out in Table 3 to obtain a short list of Candidate Sites (i.e., Step 3). An assessment to obtain a short list is required only where the long list contains more than a reasonable number of reasonable sites. If the long list does not contain more than a reasonable number of reasonable sites, then it becomes the short list and Step 3 is unnecessary. In the next step, criteria are used to compare the sites on the short list in order to identify the Preferred Site (i.e., Step 4). Once the Preferred Site is identified, the process advances to the approval stage (i.e., Step 5).

On the other hand, if at the end of Step 2, the systematic site search process within Metro fails to yield a reasonable number, or more, of reasonable sites, then instead of proceeding to Steps 3, 4 and 5, it is necessary to move to Phase 2.

3.1.2 Phase 2 - The Willing Host Site Search

Phase 2 involves the identification of willing host sites in the remainder of Ontario. It involves landowners or municipalities outside Metro in identifying lands they wish to offer for an EFW facility.

Letters sent to all municipalities in Ontario and advertisements placed in newspapers local to these municipalities will: i) invite municipalities to express their interest in hosting a Metro EFW facility (or facilities) and identify sites and ii) invite landowners and/or municipalities to offer sites. Landowners may offer only sites they own or control (i.e., no private third parties may offer sites).

Once willing municipalities and landowners are identified, site criteria, set out in Table 2B, are applied to the offered sites to identify Candidate Sites (i.e., Step 2). If this process adds Candidate Sites to the list of sites created in Phase 1, such that there is now a reasonable number, or more, of reasonable sites on the list, then the long list of sites is created. An assessment of this long list would then be conducted, using criteria set out in Table 3, to obtain a short list of Candidate Sites (i.e., Step 3). As noted above, if the long list is in fact .he short list, then Step 3 is eliminated. The process can then move to a comparison of Candidate Sites to identify the Preferred Site (i.e., Step 4). Once the Preferred Site is identified, the process advances to the approval stage (i.e., Step 5). Refer to Figure 1.

If the combination of Candidate Sites from Phases 1 and 2 does not yield a reasonable number, or more, of reasonable sites, then the site identification process advances to include the remainder of Ontario (i.e., Phase 3).

3.1.3 Phase 3 - Systematic Site Search of the Remainder of Ontario

In Phase 3, the application of criteria, as set out in Table 1, to lands in the remainder of Ontario will permit the identification of Candidate Areas (i.e. Step 1). The application of criteria, set out in Table 2A, will permit the identification of Candidate Sites within the Candidate Areas (i.e., Step 2). Sites identified through the systematic site search of the remainder of Ontario are combined with sites identified by Phases 1 and 2. If a reasonable number, or more, of reasonable sites have been identified, then the long list of sites is created. An assessment of this long list would then be conducted, using criteria set out in Table 3, to obtain a short list of Candidate Sites (i.e. Step 3). As noted above, if the long list is in fact the short list, then Step 3 is eliminated. The process can then move to a comparison of Candidate Sites to identify the Preferred Site (i.e. Step 4). Once the Preferred Site is identified, the process advances to the approval stage (i.e., Step 5). Refer to Figure 1.

If the combination of Candidate Sites from Phases 1, 2, and 3 does not yield the reasonable number, or more, of reasonable sites, then the site selection process will have to be re-evaluated.

3.1.4 Criteria

In September 1988, the SWEAP Site Criteria Task Force Paper (attached as Appendix A) identified the following site "criteria/concerns" which the Task Force believed should be considered when selecting sites for an incineration facility:

- Public Health and Safety
- Natural Environment - Air
- Natural Environment - Land
- Natural Environment - Water
- Noise, Odours and Dust
- Transportation
- Heritage and Archaeological Sites

These site "criteria/concerns" are consistent with the EFW facility site selection goal stated herein (i.e., "...employing an approach that meets the requirements of the Environmental Assessment Act").

Having regard for the site "criteria/concerns" prepared by the Task Force and considering the overall site selection goal, specific criteria have been developed and are described in this report for: i) the identification of Candidate Areas (Table 1), ii) the identification of Candidate Sites (Tables 2A and 2B) and iii) the assessment of the long list of Candidate Sites to obtain the short list of Candidate Sites (Table 3).

3.2 Site Size and Facility Design Assumptions

The systems analysis in the Waste Management Master Plan will identify the number, size and type of EFW facilities required. However, until the waste management system is finalized, the specific characteristics of the EFW component will not be known. Consequently, in the interim, assumptions pertaining to EFW facility site size and design must be made in order to identify and evaluate sites.

3.2.1 Recommended Site Size Assumptions

The EFW facility site size requirement increases with capacity. Alternatives 2 and 3 (in Discussion Paper 7.1) suggests a total daily capacity for EFW facilities could be between 3600 and 4800 tonnes per day (TPD).

The recommended minimum plant size for a Metro scale plant is 1000 TPD and hence the minimum site size is 8 ha.

The site size allows for the following:

- access roads and weigh scales for waste delivery
- a holding lane for queuing trucks
- service truck access for ash and residuals removal and plant maintenance
- plant personnel access and parking
- public vehicle access and parking
- solid waste receiving, tipping, storage and removal of unacceptable material
- solid waste pre-processing area inside a building
- waste feed and related combustion equipment
- gas cleaning and stack area
- turbine/generator, cooling tower, and auxiliaries
- ash and residue transfer system storage and removal
- utility connections
- office, control and locker rooms and visitor's gallery
- orientation of above to suit shape and contour of potential site
- landscaping, screening, and buffer zone

If there is an inadequate outlet for stormwater from a site (once developed) for the 1,000 tonne/day EFW facility, an additional 2 ha area may be required for stormwater control facilities.

3.2.2 Recommended Facility Design Assumptions

The waste materials to be burned at an EFW facility will be: firstly, all available combustible residuals from composting facilities and MRFs; and secondly, material in the solid waste stream that is combustible, appropriate to burn, non-recyclable and which would otherwise be directed to landfill.

The design of an EFW facility must recognize and attempt to mitigate potential detrimental effects resulting from EFW operations (e.g., air emissions and the consequences of ash management) as much as is reasonably possible.

To increase siting opportunities, the design and operation of an EFW facility needs to address as many potential detrimental effects as is reasonably possible. Therefore, to address these needs and for the purpose of the site search, it is assumed that the following will be included in the design and operation of a Metro facility:

- proven EFW technology with a history of successful operations;
- best available proven technology for air emission control;
- all solid waste handling operations will be enclosed and buildings will have controlled ventilation for odour control;
- wastewater and stormwater will be collected on site and appropriately managed;
- ash and process residuals will be treated and recycled or directed to off-site disposal facilities;
- a minimum 50 metre buffer zone located on the EFW facility site will be established adjacent to all above-ground principal structures; and
- generous amounts of landscaping and, where appropriate, berms and other forms of screening will be incorporated into the design of the site's grounds.

3.3 Step 1: Identify Candidate Areas

Whether it be within Phase 1 or 3, the first step in the selection process is to identify Candidate Areas. The Candidate Areas will be identified through the application of criteria described in Table 1. Zoning and Official Plan documents and agency contacts will be the source of information to identify Candidate Areas. This step is not necessary in Phase 2 (willing host) because sites, not areas, will be offered.

3.4 Step 2: Identify Candidate Sites

The second step in all phases is to identify Candidate Sites, whether from within Candidate Areas or from sites offered by willing hosts. For Phases 1 and 3, a list of Candidate Sites is created by identifying sites within the Candidate Areas by applying the criteria shown in Table 2A. The site(s) found in each Candidate Area then make up the list of Candidate Sites. For Phase 2, a list of Candidate Sites is created by applying the criteria in Table 2B to the willing host sites.

Some relevant matters such as the amount and nature of air emissions and ash management are considered to be the same regardless of where an EFW facility is located and, therefore, are not proper site identification criteria.

If a site which complies with the identification criteria is larger than the site size guidelines, it may be subdivided to form Candidate Sites which comply with the site size guidelines. These Candidate Sites will then be included in the list of Candidate Sites.

Secondary source information, agency contracts and possibly supplementary field investigations will be used in the identification of Candidate Sites. Under the category of Technical, plans showing property boundaries and sketches of preliminary plant layouts will be used to determine the sufficiency of the Candidate Site size.

If, upon completing Step 2 in any Phase in the site selection process, a reasonable number, or more, of reasonable sites have been identified, the long list of reasonable sites will have been created and the Candidate Site identification process need go no further.

3.5 Step 3: Assess Long List of Candidate Sites to Obtain Short List of Candidate Sites

If there are more than a reasonable number of reasonable sites on the long list, further assessment using the criteria in Table 3 will be carried out to create a short list of sites. The sites identified in this step will constitute the short list of sites and will be subject to a detailed site-specific comparative evaluation to determine the Preferred Site. If the long list of sites does not consist of more than a reasonable number of reasonable sites, this step will be omitted.

As in Step 2, some relevant matters such as the amount and nature of air emissions and ash management are considered to be the same regardless of where an EFW facility is located and, therefore, will not be included as assessment criteria in this step.

This analysis will use a more detailed level of investigation to assess the long list of sites. Secondary sources, agency contacts and reconnaissance field investigation will be used in the application of criteria. Any severe site constraints will be identified. The feasibility and the means and cost of mitigation required to reduce or eliminate all such constraints will be determined.

3.6 Step 4: Compare Candidate Sites on Short List to Identify Preferred Site

Once a short list of Candidate Sites has been identified that meets the test of a reasonable number of reasonable sites, a comparative evaluation process will be undertaken on a site-specific basis.

The purpose of the comparative evaluation will be to select the Preferred Site. An intensive scrutiny of each site and an identification of differences between sites will allow comparisons to be made and the Preferred Site to be selected. The analysis

will be site specific and, where possible, will include quantitative descriptions of potential impacts of siting an EFW facility using six of the categories of criteria listed in the Tables 2A, 2B and 3. In this step, matters having to do with Land Use will be comparatively evaluated under the category of Social/Cultural. Under the category of Human Health and Safety, the impacts of air emissions from an EFW facility will be determined.

In some cases, the measurements of environmental acceptability will bear a direct relationship to published standards. In other cases, the measurements of environmental acceptability will involve professional judgments on potential impacts and their significance.

The criteria to be selected for this step will depend on the characteristics of the sites on the short list and, therefore, the criteria will be developed once the short list of sites has been obtained. As in Step 3, but in greater detail and with greater precision, the means and the cost of mitigation required to reduce or eliminate constraints identified for each site on the short list will be determined.

If the comparative evaluation of the short list of Candidate Sites does not identify the Preferred Site (i.e., Step 4), and Candidate Site identification in all three phases has not been completed, it is necessary to re-enter the phased approach to site selection. There are two points of re-entry: if the phased approach has not yet identified Phase 2 willing host Candidate Sites, then the process advances to this Phase; otherwise, the process advances to Phase 3 and identifies Candidate Areas and ultimately Candidate Sites for inclusion on the long list.

Since Phase 3 includes lands in the remainder of Ontario, it is expected that at the end of Step 2 in this phase, a reasonable number, or more, of reasonable sites will have been leading to the selection of a Preferred Site. If this does not happen, the site selection process will have to be re-evaluated.

3.7 Step 5: Obtain Approvals for Preferred Site

Ultimately, proper documentation under the Environmental Assessment Act and Environmental Protection Act, and other relevant legislation will be prepared and submitted to the relevant approval authorities for each Preferred Site for an EFW facility.

3.8 Summary of Site Selection Approach

The site search approach is summarized below:

Step 1:	Identify Candidate Areas
Step 2:	Identify Candidate Sites
Step 3:	Assess Long List of Candidate Sites to Obtain Short List of Candidate Sites
Step 4:	Compare Candidate Sites on Short List to Identify Preferred Site
Step 5:	Obtain Approvals for Preferred Site

The approach is further summarized in Figure 1.

3.9 Siting of Subsequent EFW Facilities

As noted earlier, after the first preferred EFW site is selected, the siting process described in this report can be followed a subsequent time to identify a subsequent Preferred Site for an EFW facility, should Metro choose to do so. In this regard, Candidate Sites which were not selected as the Preferred Site under the previous process are eligible for consideration in the subsequent process.

4.0 PUBLIC PARTICIPATION

Public involvement is an essential part of Metro's solid waste environmental assessment program. Since the beginning of the planning process the public has been involved in the design and the implementation of advisory caucuses representing different sectors of the public, a multistakeholder committee, representing all of the advisory caucuses, and occasional task forces which have worked on specific issues. (This public participation program is described in detail in other SWEAP documents.)

The intent of the public participation process is to provide all those who may be affected by the waste management master planning process (the "affected parties"), an opportunity to participate in the development of the plan before it is submitted to the Minister of the Environment by Metropolitan Council. Since representatives of the various sectors that generate, manage or are otherwise concerned with waste within Metro Toronto are, by definition, affected parties, Metro has sought out their participation through the Advisory Caucuses. Any other groups or individuals who feel that they are or may become affected by Metro's solid waste master planning can have access to all the SWEAP documents and their comments will be recorded and taken into account in all further planning.

In addition, Metro considers that those who live in communities where waste management facilities may be sited will become affected parties as soon as potential sites are identified and should be actively invited to participate in Metro's planning process. For this reason, it is Metro's intention to initiate activities to facilitate participation by all interested residents in each community neighbouring a short-listed site, as well as by all those who actively propose that a site in their area be considered.

The exact nature of the activities which Metro will undertake in each such community will be determined, to the degree possible, in consultation with existing community groups near each potential site. It is Metro's intention to provide opportunity for public input on site-specific matters as well as on the site selection process and Metro's Solid Waste Management Master Plan as a whole.

5.0 GLOSSARY

Areas of Natural and Scientific Interest (ANSI):	Areas of land and water containing natural landscapes or features which have been identified as having values related to protection, natural heritage, scientific study or education (Ministry of Natural Resources).
Candidate Areas:	Those lands that meet the criteria described in Table 1 (i.e., Step 1 in Phase 1 and 3).
Candidate Sites:	Those lands that meet the criteria described in Table 2A or Table 2B (i.e., Step 2 in all phases).
Comparative Evaluation:	The application of comparative evaluation criteria (as defined in Step 4) to the short list of Candidate Sites leading to the selection of the Preferred site for an EFW facility.
Long List of Candidate Sites:	A list of sites containing a reasonable number, or more, of Candidate Sites.
Short List of Candidate Sites:	A list of sites containing a reasonable number of Candidate Sites.

Preferred Site:	The recommended site for an EFW facility that is identified as a result of comparative site evaluations.
Site Selection Goal:	The overall goal of the site selection process.
Site Size and Facility Design Assumptions:	The presumed characteristics of the EFW facility.
Study Area:	The geographic area which is examined in the search for the Preferred Site for an EFW facility.
Urban Shadow:	Areas undergoing a transition from agricultural to non-agricultural uses as a result of urban expansion pressures.
Waste Management Master Plan	A document describing a solid waste management system to serve a municipality for a defined period of time.

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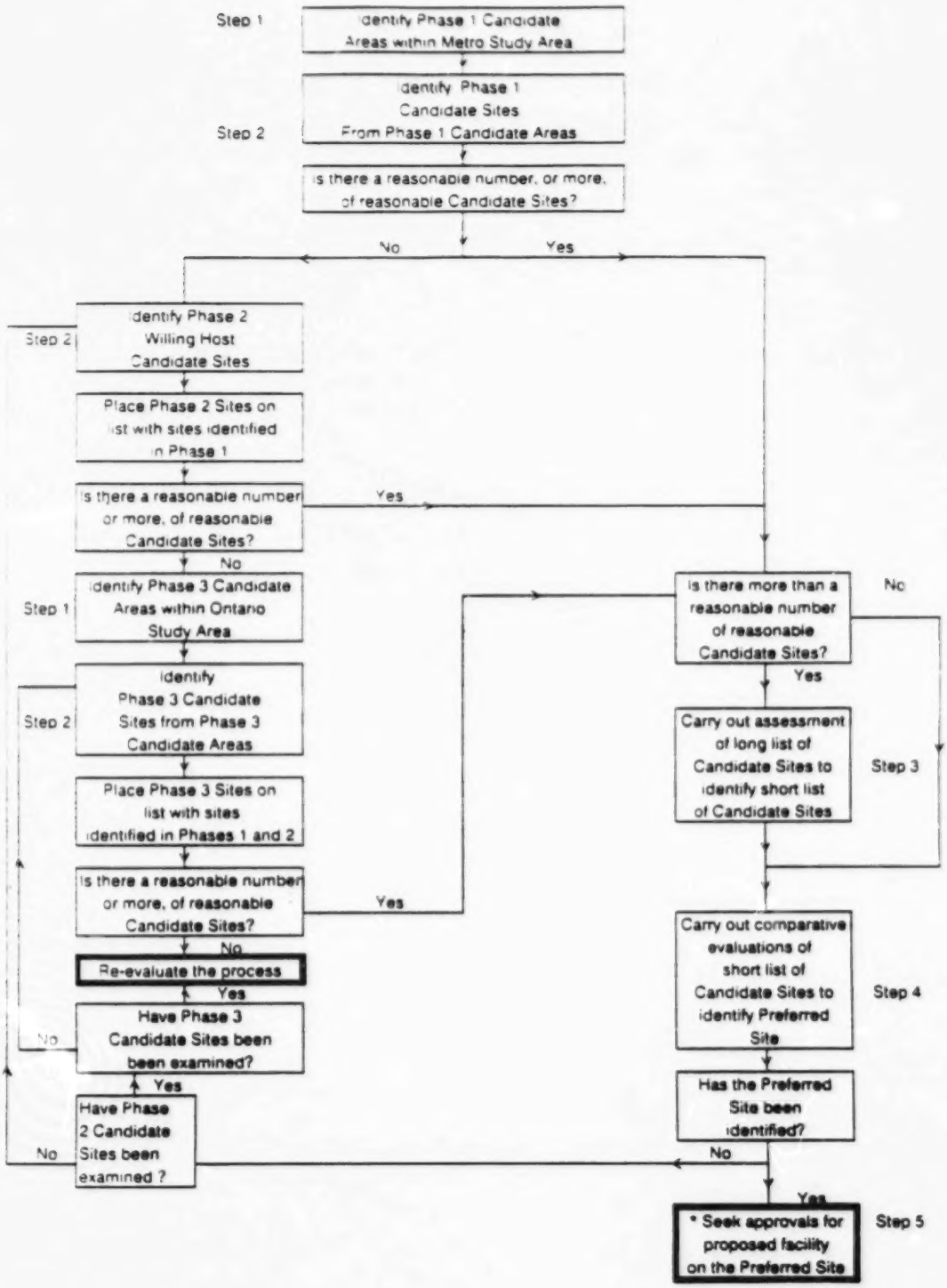
FIGURE 1
SITE SELECTION PROCESS
METRO TORONTO ENERGY FROM WASTE FACILITIES


Step 1
Identify Phase 1 Candidate Areas within Metro Study Area
Step 2
Identify Phase 1 Candidate Sites From Phase 1 Candidate Areas
Is there a reasonable number, or more, of reasonable Candidate Sites?
No
Yes
Step 2
Identify Phase 2 Willing Host Candidate Sites
Place Phase 2 Sites on list with sites identified in Phase 1
Is there a reasonable number or more, of reasonable Candidate Sites?
Yes
No
Step 1
Identify Phase 3 Candidate Areas within Ontario Study Area
Step 2
Identify Phase 3 Candidate Sites from Phase 3 Candidate Areas
Place Phase 3 Sites on list with sites identified in Phases 1 and 2
Is there a reasonable number or more, of reasonable Candidate Sites?
Yes
No
Re-evaluate the process
Yes
No
Have Phase 3 Candidate Sites been been examined?
Yes
No
Have Phase 2 Candidate Sites been examined ?
Is there more than a reasonable number of reasonable Candidate Sites?
No
Yes
Carry out assessment of long list of Candidate Sites to identify short list of Candidate Sites
Step 3
Carry out comparative evaluations of short list of Candidate Sites to identify Preferred Site
Step 4
Has the Preferred Site been identified?
No
Yes
* Seek approvals for proposed facility on the Preferred Site
Step 5

Identification of Sites:
Phase 1: Systematic Site Search Inside Metropolitan Toronto
Phase 2: Willing Host Site Search
Phase 3: Systematic Site Search of the Remainder of Ontario
* Approvals will be sought for each facility on each site on an individual basis.

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CRITERIA FOR THE IDENTIFICATION OF CANDIDATE AREAS (I.E., STEP 1)

TABLE 1

Criteria Category	Land Use
Criteria	o Vacant land which is zoned industrial or designated in an Official Plan as industrial, whether offered to Metro or otherwise, or o Land which is zoned industrial or designated in an Official Plan as industrial, which is offered to Metro, or o Land which is zoned agricultural or designated in an Official Plan as agricultural where such land is considered to be in the urban shadow, whether offered to Metro or otherwise, or o Land currently or formerly used for waste management purposes, which is offered to Metro, or o Land, where a municipal proponent of an offered site for a landfill facility requires that an EFW facility be provided on or adjacent to the offered site, or o Any combination of the above
Source of Information	o zoning and Official Plan documents o agency contacts

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CRITERIA FOR THE IDENTIFICATION OF CANDIDATE SITES
IN CANDIDATE AREAS (I E , STEP 2)

TABLE 2A

Criteria Category	Human Health and Safety	Natural Environment	Social/Cultural	Land Use	Economic/Financial	Technical	Legal/Jurisdictional
Criteria	o Site must not be in conflict with Transport Canada regulations respecing the height of stack relative to air transport operations	o Site must not fall into any Areas of Natural and Scientific Interest (ANSI's)	o Site must not include major features of known historical, heritage, cultural, architectural, or archaeological value	o Site must not be in desig nated conservation areas, federal, provincial or municipal parks, or designated floodplains (i e , by Regulation Fill Line)	o No Step 2 identification criteria	o Site must be of sufficient size to provide for EFW facilty operating requirements including adequate buffer and screening area	o No Step 2 identification criteria
Source of Information	o secondary source information, zoning and official plan documents, aerial photographs, land assessments records, agency contacts, field investigations, interviews, published information					o Plans showing property boundaries and sketches of preliminary EFW plant layout	

CRITERIA FOR THE IDENTIFICATION
OF CANDIDATE SITES FROM LIST
OF WILLING HOST SITES (I.E., STEP 2)

TABLE 2B

Criteria Category	Human Health and Safety	Natural Environment	Social/Cultural	Land Use	Economic/Financial	Technical	Legal/Jurisdictional
Criteria	o Site must not be in conflict with Transport Canada regulations respecting the height of stack relative to air transport operations	o Site must not fall into any Areas of Natural and Scientific Interest (ANSI's)	o Site must not include major features of known historical, heritage, cultural, architectural, or archaeological value	o Site must not be in designated conservation areas, federal, provincial or municipal parks; or designated floodplains (i.e., by Regulation Fill Line), and o Site must be on o Land which is zoned industrial or designated in an Official Plan as industrial, or o Land which is zoned agricultural or designated in an Official Plan as agricultural where such land is in the urban shadow, or o Land currently or formerly used for waste management purposes, or o Land where a municipal proponent of an offered site for a landfill facility requires that an EFW facility be provided on, or adjacent to the offered site, or o Any combination of the above	o No Step 2 identification criteria	o Site must be of sufficient size to provide for EFW facility operating requirements, including adequate buffer and screening area	o No Step 2 identification criteria
Source of Information	o zoning and Official Plan documents, agency contacts and field investigations, if appropriate					o Plans showing property boundaries and sketches of preliminary EFW layout	

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CRITERIA FOR THE ASSESSMENT
OF THE LONG LIST OF CANDIDATE SITES TO
IDENTIFY A SHORT LIST OF CANDIDATE SITES (IE., STEP 3)

TABLE 3

Criteria Category	Human Health and Safety	Natural Environment	Social/Cultural	Economic/Financial	Technical	Legal/Jurisdictional
Criteria	o Distance from designated flight paths of licensed airports as defined by the Federal Department of Transport o Effect of traffic changes on injury and non injury traffic accident rates o Effect of noise, odour and dust	o Number, extent and significance of woodlots that would be cleared o Proximity to ANSI's o Proximity to designated flood plain areas (i.e., by Regulation Fill Line) o Proximity to environmentally sensitive areas as identified in municipal Official Plans o Proximity to natural resource areas (e.g. gas/oil pool formations, mineral aggregate resources)	o Number of businesses and residences that would be disrupted by an EFW facility on a candidate site o Number of businesses and residences that would be displaced by a candidate EFW site o Impact of EFW facility related traffic upon areas adjacent to traffic routes o Proximity to major features of known historical, heritage, cultural, archaeological or architectural value o Proximity to potentially affected farming activities o Proximity to major recreational activities o Distance from adjacent sensitive land uses as defined by MOE	o Site acquisition cost o Distance of a candidate EFW site from the location of solid waste generation o Proximity of Provincial highways, Metro arterial roads, County or Regional roads to a candidate EFW site o Length and cost of access road requiring construction/improvement to serve an EFW facility located on a candidate site o Proximity of energy customer or feasible point of input to electical power grid relative to a candidate EFW site	o Presence of underground and overhead facilities on a candidate EFW site that may require displacement or elimination o Distance of a candidate EFW site to sanitary sewers, water supply, gas supply, electrical supply and stormwater disposal facilities and adequacy of those facilities in relation to demands on an EFW facility o Feasibility, means and cost of mitigation required to reduce or eliminate all constraints identified	o Degree of difficulty in obtaining approvals having regard for local by laws, provincial and federal laws and policies
Source of Information	o secondary source information, zoning and Official Plan documents, aerial photographs, land assessment records, agency contacts, field investigations, interviews, and published information					

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APPENDIX A

"Site Criteria Issues to be Addressed by SWEAP"

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SITE CRITERIA

ISSUES TO BE ADDRESSED BY SWEAP

Prepared by:

SWEAP Task Force #1

September, 1988.

Authors:

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I. ORIGINAL MANDATE OF TASK FORCE #1

*To make recommendations on what factors/criteria should be considered when selecting sites for landfill, incineration, composting or recycling.

*To rank the criteria for each type of facility.

*To suggest how the criteria can be used to make comparative evaluations of the actual sites.

II. SOME GENERAL COMMENTS

*We are aware that we may have missed some criteria or factors or rationale in this report. However, the underlying principle of all the criteria is that we don't want any hazardous effects associated with any of the facilities - either in the near future or affecting future generations. We hope that by applying these criteria to the different facilities, the site selection processes for SWEAP will be socially responsible and ecologically sound.

*The criteria listed on the next pages should be seriously considered in selecting sites for the different kinds of waste management facilities. However, in meeting these criteria, it is also important not to hide the problems associated with our garbage. These sites should be located within a reasonable distance from the generating community, within the borders of the municipality/region. The sites must be in view of the public to remind us that we have to keep reducing waste at the source.

Citizens of a municipality will not acknowledge responsibility for their wastes unless they are confronted with all the stages of the waste management process. Therefore, ideally, management of wastes, including "disposal" must take place within the immediate area of generation (e.g., daily commutershed).

Obviously, hazardous waste needs special treatment and may need to be transported to a facility outside the source municipality. However, every effort should be made to ensure all citizens are aware of the responsibilities they must take for their wastes.

*In the criteria listed on the following pages, we have made a somewhat artificial separation between health and environmental criteria. This separation is largely to facilitate the reader. In reality, health and environmental quality cannot be separated. Releasing toxic chemicals into the environment - our ecosystem, will ultimately expose us to the health risks associated with those chemicals. Our good health depends heavily on an environment

free of toxic contaminants.

Buffer zones are mentioned as a criterion for several of the facilities. We feel very strongly that buffer zones are an essential and integral part of any waste management facility. The need for and extent of a buffer zone varies with the different kinds of facilities. For example, berms, trees and distance may be needed for landfills, while industrial zoning for a 3 block perimeter may be appropriate for a materials recovery facility.

*Existing public utility and transportation corridors can act as buffer area. Therefore, it may be advantageous to site a waste management facility adjacent to such corridors.

*If a waste management facility is sited in a non- residential area, it is critical that the selected area and the land around the site is zoned non-residential to avoid problems in the future, particularly after the facility has closed down or has been replaced.

*Some innovative communities have built community/recreational facilities in conjunction with the waste management facilities. For example, swimming pools, community centres, green space in the buffer zones. This is one way of making waste management facilities more acceptable to the receiving community. A needs assessment of the community should be performed to determine what kind of agreement can be reached. In some cases, the waste management facility may generate a product that can be useful at the community facility, e.g. compost. The decision to construct a multi-use facility may also be used in the comparative evaluation of several sites.

III . SITE CRITERIA/CONCERNS FOR A LANDFILL FACILITY

RANKING OF SITE CRITERIA:

Task Force #1 ranked the screening criteria as follows:

(1) Water variables - Potential Pollution of Groundwater/Drinking Water.
(1) Water variables - Flood plain.
(2) Minimum distance to residential areas.
(2) Ecologically sensitive areas.
(3) Water Variables - minimum distance to water bodies.
(3) Heritage/Archaeological sites.
(4) Subsurface soil type.
(5) Conservation areas.
(6) Agricultural lands.
(7) Transportation.
(8) Aggregate Resources.

The numbers indicate relative importance of the criteria. (1) is most important and (8) is least important. Where different criteria have the same number, it means that they have the same level of importance.

RATIONALE FOR RANKING:

The screening criteria were discussed and justified as follows:

(1) Water variables:

(1.1) Avoid the pollution of groundwater which is a source of drinking water for well users and has many far reaching ecological implications.

(1.2) Not on flood plain
(a) avoid

(1.3) Sufficient distance from water bodies (lakes, rivers, streams) to avoid seepage of contaminants from landfill.
(a) We do not know enough about geologic principles to specify how far this distance should be, but systems such as purge wells need to be located a certain distance from bodies of water in order to be at all effective.

(2) Distance to landfill from residential areas:

(a) Important because of:

HEALTH

- stress - social and psychological implications at individual and community level.
- potential hazards associated with methane leakages
- dust, litter & fumes from trucks
- increased traffic from trucks & their associated impacts

AESTHETICS

- noise (traffic, operations etc.)
- odours (and poisonous gases)
- visual effects e.g., blowing paper, description of landscape

- property value decreases
- birds - mainly seagulls

(b) Factors to be considered in defining a minimum distance should include prevailing winds.

(2) Not in an ecologically sensitive area and at least some minimum distance from an ecologically sensitive area.

(a) We do not have enough knowledge to specify a minimum distance from an ecologically sensitive area, but feel that the distance should be great enough so as not to disrupt the balance of the existing ecological systems.

(b) We would like to see ecological experts involved in the decision about specifying minimum distance and in defining ecologically sensitive areas.

(3) Not on a heritage or archaeological site and not close enough to damage the site physically or aesthetically.

(a) These sites are irreplaceable. They can continue to provide educational and cultural enrichment. Certain sites may be indigenous people's burial grounds and should not be desecrated.

(b) We would like to see historians and archaeologists involved in defining heritage and archaeological sites and provide information specifying possible minimum distances for different heritage and archaeological sites.

(4) Subsurface Soil Type: subsurface soil should have low degree of porosity.

(a) Minimize waste contamination in case of leachable collection failures.
(b) We do not have enough knowledge to specify what a "minimum porosity" is.

(5) Not in or near a Conservation area or other recreational lands.

(a) These areas have already been designated as valuable resources.

(6) Not on C.L.I. Class I, II, or III agricultural lands.

(a) This type of land is an irreplaceable resource in Ontario.

(7) Transportation tables: no truck routes through urban areas, except industrial areas.

(a) Health and aesthetic considerations.

(b) Avoid ecologically sensitive areas, conservation areas, and archaeological sites.
(c) Increased congestion on roads and increased damage to these roads.
(d) Potential for increased accidents.

(8) Not on sites containing aggregate resources.

(a) These are irreplaceable resources and come from subsoils which provide the worst type of natural sealant.

COMPARATIVE EVALUATION FACTORS:

These factors should be used to compare different sites:

1. Site search and development costs
2. Reliability, size and service level
3. Same municipality as the generating facility.

IV. SITE CRITERIA/CONCERNS FOR A COMPOSTING FACILITY

RANKING OF SITE CRITERIA:

Composting site criteria were discussed and ranked as follows:

(1) Public Health & Safety (vectors, occupational)
(2) Noise & Odour - composting/leachate treatment
(3) Natural Environment (land, air, water, leachable treatment system)
(3) Heritage & Archaeological features
(4) Transportation of Wastes to Compost------Site
(5) Public Accessibility of Compost (farmers, etc.)
(6) Hydrogeology

The numbers indicate the order of relative importance of the site criteria. (1) is the most important and (6) is the least important. Where 2 criteria have the same number, it means that they are ranked equally.

RATIONALE FOR RANKING:

Rationale for these criteria are similar to those for the landfill site.

Some additional comments were made and the numbers correspond to the numbers listed previously:

(1) Public Health and Safety (vectors, and others listed below);
Occupational Health & Safety;
(2) Noise and odour controls for each facility and its treatment plant;
(3) Avoid heritage and archaeological features - a buffer zone is needed here too.
(4) Transportation to and from site, avoid residential areas and dense urban areas, avoid routes that would fu ther congest traffic and that is accessible to the public (farmers, nurseries, gardeners, etc.);
(5) Public Accessibility of Compost - Compost has other uses as well as soil conditioner/ fertilizer. For example, concrete-type materials can be made from compost for use in sound barriers and slope stabilization. These other uses should be considered during site selection to facilitate the end use and distribution of the compost.
(6) Hydrogeology; not in flood prone area or near streams, etc. (site should have complete control over its leachate - concreted in, proper drainage files, etc.)

COMPARATIVE EVALUATION:

These factors should be used to compare different sites:

1. Sizing - few big sites or several smaller sites or both, depending on what goes to each site for the production of various types of compost;
2. Buffer Zone and Zoning (industrial lands, very poor agricultural lands are preferred);
3. Site may need further controls/additions to its facilities beyond those listed within the Certificate of Approval.

V. SITE CRITERIA /CONCERNS FOR AN INCINERATION FACILITY

RANKING OF SITE CRITERIA:

The site criteria for an incineration facility were ranked as follows:

(1) Public Health and Safety
(1) Natural Environment - Air
(2) Natural Environment - Land
(2) Natural Environment - Water
(2) Noise, Odours and Dust
(3) Transportation
(3) Heritage and Archaeological sites

The numbers indicate the order of relative importance of the site criteria. (1) is the most important and (3) is the least important. Where 2 criteria have the same number, it means they are equally important.

RATIONALE FOR RANKING:

(1) Public Health and Safety:

- A risk assessment is needed at each potential site to take into account the total chemical exposure of the downwind population.

- The public should be involved in deciding what is an acceptable risk.

- The selected site must minimize the public's exposure to disease vectors, such as birds, insects, rats.

- Occupational health and safety standards should be rigorously adhered to and care should be taken to protect the public from accidental and chronic health hazards.

- The selected site/facility should create minimal social impacts. Although standard social impacts (e.g., noise and odour) can often be mitigated by technological solutions, site selection can influence the magnitude of such impacts. Similarly, special social impacts often result from when the public fears potential health risks or feels a lack of control over their community. If these social impacts persist in the long term, they can cause serious health effects such as stress related symptoms.

(1) Air:

- There are two general types of air emissions from incinerators, stack emissions and fugitive emissions from operations. In order to minimize the environmental and social impacts of stack emissions, the incinerator should avoid emitting pollutants downwind to residential areas, farmlands or water resources, regardless of the levels of technology employed.

- In order to minimize public exposure to fugitive emissions from the incinerator, locating the facility in an industrial area or providing a significant buffer zone should be considered and dust control measures should be implemented.

(2) Land:

- In selecting a suitable incinerator site, it is impossible to separate it from the issue of ash disposal. Incinerator ash can contain many toxic chemicals. Similarly, the ash leachate can be highly contaminated. Therefore, it is essential that a site is available which can receive

hazardous waste, such as incinerator flyash. Furthermore, toxic elements such Hg should be prevented from entering the incinerator and scrap metals should be extracted from the ash to minimize total chemical loading to the ecosystem.

(2) **Water:**

- Again, leachate from the ash disposal is a major concern at the receiving hazardous waste site.

- Also, the fallout of atmospheric emissions into water resources should be considered in the site selection of the incinerator.

- If contaminated wastewaters are generated at the incinerator, treatment should be available on site. This affects the amount of space needed for an incinerator facility and may affect siting choices.

- If wastewater treatment on site is not possible due to the technology or space required, then the wastewater could be transported to an appropriate treatment facility. However, impacts along the transportation routes should also be considered (see comments below on TRANSPORTATION).

(2) **Noise, Odours and Dust:**

- The noise of trucks loading and unloading ash and garbage and of the incinerator itself require that the incinerator is located in an industrial area. Alternatively, a significant buffer zone is needed and the impacts of truck traffic assessed.

- Odours and dust from the stack emissions, the raw garbage and the trucks' exhaust contribute to the social impacts of the selected sites.

(3) **Transportation :**

- The site selection should consider the transportation of waste to the incinerator as well as ash away from the incinerator.

- Routes of access in an urban setting are major factors in selecting a site. These routes should avoid institutions, such as hospitals and schools and residential areas and should favor industrial areas.

- The vehicles transporting waste and ash should be viewed as mobile waste facility sites. As such, the same criteria should apply to the selection of access routes as apply to the selection of the incinerator site.

(3) **Heritage and Archaeological Sites:**

• These are irreplaceable resources and should be preserved for future generations.

Size and Number:

• The size and number of incinerators is partly determined by the design of the facility, the energy demand (if it is EFW) and the availability of fuel (i.e., non-recyclable combustible garbage).

• It is difficult to make general statements about a favourable location because the design, type and size of the facility has considerable bearing on whether or not the site is physically suitable and socially acceptable. For example, a smaller incinerator may be more readily accepted near a residential community than a larger incinerator. However, the energy demand, fuel supply (available waste) and incinerator technology may not be compatible with the smaller size incinerator.

• The site selection for incinerators should consider how many incinerators (or other sources of air emissions) there are in the neighbourhood and how large such facilities are. oIt is important that the site selection is made from the broadest possible perspective, i.e., taking into account the concerns and criteria listed here.

VI. SITE CRITERIA/CONCERNS FOR A TRANSFER STATION/MATERIALS RECOVERY STATION

RANKING OF SITE CRITERIA:

Site Criteria were ranked as follows:

(1) Public Health and Safety
(2) Transportation
(2) Natural Environment - Water
(2) Noise, Odours and Dust
(2) Heritage and Archaeological features

The numbers indicate the order of relative importance of the site criteria. (1) is the most important and (2) is less important. Where 2 criteria have the same number, it means that they are ranked equally.

RATIONALE FOR RANKING:

(1) Public Health and Safety:

- The selected site must minimize the public's exposure to disease vectors, such as birds, insects, rats.

- Occupational health and safety standards should be rigorously adhered to and care should be taken to protect the public from accidental hazards.

- The selected site/facility should create minimal social impacts. Although standard social impacts (e.g., noise, odour) can often be mitigated by technological solutions, site selection can influence the magnitude of such impacts. Similarly, special social impacts often result from when the public fears potential health risks or feels a lack of control over their community. If these social impacts persist in the long term, they can cause serious health effects such as stress related symptoms.

(2) Transportation:

- The site selection should consider the transportation of waste to and from the transfer station.

- Routes of access in an urban setting are major factors in selecting sites. The route should avoid institutions, such as hospitals, schools and residential areas and should favour industrial areas.

- The vehicles transporting waste and ash should be viewed as mobile waste facility sites. As such, the same criteria should apply to the selection of access routes as apply to the selection of the transfer station site.

(2) Water:

- Leachate draining from the garbage can contain insecticides and deodorizers as well as chemical leachate from the garbage itself. This leachate should be tested for hazardous chemicals. Then the leachate should be contained in a closed interceptor tank and transported to an appropriate treatment facility (e.g., on-site treatment facility at a landfill).

(2) Noise, Odours and Dust:

- The noise of trucks loading and unloading garbage at the transfer station require that the station is located in an industrial areas. Alternatively, a significant buffer zone is needed and the impacts of truck traffic assessed.

• Odours and dust from the transfer station, the raw garbage and the trucks' exhaust contribute to the social impacts of the selected and further justify the need for a buffer zone near residential areas.

(2) **Heritage and Archaeological Features:**

• These features are irreplaceable and should be avoided for the siting of all waste management facilities including transfer stations.

COMPARATIVE EVALUATION:

Size and Number:

• The size and number of transfer stations is partly determined by the design of the selected waste management system for SWEAP.

• It is difficult to make general statements about a favourable location because the design, type and size of the facility has considerable bearing on whether or not the site is physically suitable and socially acceptable. For example, a smaller transfer station may be more readily accepted near a residential community than a larger transfer station.

• The site selection for transfer stations should consider how many other transfer stations and other waste management facilities there are in the neighbourhood and how large such facilities are. There are questions concerning the equitable distribution of the inconveniences and risks associated with waste management facilities as well as questions of practicality.

•It is important that the site selection is made from the broadest possible perspective, i.e., taking into account the concerns and criteria listed here.

Buffer Zone and Zoning:

• Industrial lands, industrial/commercial mix areas and very poor agricultural lands are preferred.

• If the transfer station is located in a residential area, a buffer zone of at least two blocks is needed around the facility. Most complaints about existing transfer stations are made within this distance.

• Transfer stations should not operate 24 hours per day in residential areas, i.e., If it is necessary to operate a transfer station 24 hours per day, then the facility must be located in a non- residential area.

• A study should be undertaken to investigate the limitations of different types of transfer station sites. For example, in a heavily industrial area, a transfer station could receive more heavy vehicles for up to 24 hours per day, whereas in a residential/commercial area, such operating conditions would be disruptive to the community.

OTHER CONSIDERATIONS:

• New transfer station facilities should consider the possibility of siting discrete material recovery, sorting and composting facilities at the same location. Clustering these facilities could take advantage of:

- leachate treatment on site
- accessibility of facility for transportation of materials
- minimizing the number of different sites for these
- landspace may be saved
- exchange of materials between facilities
- better buffer zones could be established

• It is essential that the siting of new transfer stations takes into account the problems experienced in the past. Files on complaints to existing transfer stations should be investigated to ensure all potential problems have been addressed. It is easier and less costly to include mitigative measures in the early planning /construction phases than to retrofit the facility after the neighbourhood starts making complaints.

COMPONENT 7

MASTER PLAN

DISCUSSION PAPER NO 7.1

TOWARDS A SOLID WASTE MANAGEMENT MASTER PLAN:

A STATUS REPORT ON METROPOLITAN TORONTO'S PLANNING PROCESS

METROPOLITAN TORONTO
DEPARTMENT OF WORKS
SOLID WASTE MANAGEMENT DIVISION

BY:
THE PROCTOR & REDFERN GROUP

January, 1990

EXECUTIVE SUMMARY OF DISCUSSION PAPER 7.1 ENTITLED - TOWARDS A SOLID WASTE MANAGEMENT MASTER PLAN: A STATUS REPORT ON METROPOLITAN TORONTO'S PLANNING PROCESS

PURPOSE OF DISCUSSION PAPER NO. 7.1

Discussion Paper No. 7.1 represents an important step in the development of a long-term solid waste management system for the Municipality of Metropolitan Toronto (Metro) and provides the basis from which public consultation and subsequent technical activities should be undertaken. In this regard, it is important that participants in Metro's Solid Waste Environmental Assessment Plan (SWEAP) planning process understand the purpose and intent of the Discussion Paper which is:

- to consolidate and summarize information prepared by Metro and its consultants. A comprehensive data base is available on the quantities, sources and types of solid waste currently generated in Metro. Data on the composition of solid waste requiring future management are sufficient for this stage of the planning exercise. However, more waste composition data are required as the planning process develops and programs and facilities proceed to implementation,

- to identify the study area, and to determine waste management needs and facility siting opportunities within that study area. It has been decided by Metro that the study area relative to waste management needs should include Metropolitan Toronto and its six area municipalities. In other words, the quantity of solid waste generated in Metro by both public and private sectors represents the extent of the "problem" for waste management planning purposes,

- to discuss the siting of waste management facilities which considers a broader study area beyond Metro Toronto,

- to respond to the waste diversion from landfilling objectives established by Metro Council and the Province. Metro's objectives are to divert solid non-hazardous waste from landfill. Provincial targets are to divert this waste from landfill and incineration,

- to develop for further consideration by Metro Council, solid waste management policies and long-term objectives. The preparation of this Discussion Paper considered the draft waste management policies that were provided to Metro Works Committee in January 1989,

- to establish the philosophical and practical objectives upon which to form the basis of a system. The process must be rational, understandable, fair and one that fully complies with the Environmental Assessment Act (EAA), other relevant provincial legislation, public and government agency input and most importantly, the needs and priorities of the Metro community,

- to outline the basis for establishing a 40-year or longer solid waste management master plan. There is a need for an ambitious plan that strives towards near-zero waste generation and, hence sustainable development,

- to establish a rationale and the approach that can be used to develop and then evaluate alternative approaches to manage solid waste over the next 20 years and longer. Three "Alternative" waste management systems were developed and are presented in the Discussion Paper, and

- to identify evaluation factors that could be used in subsequent Metro studies leading to the development of the Solid Waste Management Master Plan. System "screening" factors have been used to develop and select the three alternative systems. It is intended that system "comparative" factors be used to evaluate and compare the three alternative systems as well as those alternatives and modifications that might result from public and government agency review of the Discussion Paper.

INPUT FROM OTHER PARTICIPANTS

The Discussion Paper describes the status and progress to date of the broader SWEAP planning process that was initiated with the preparation of the "Appraisal Study" in 1986. Metro staff and the SWEAP Technical Group assisted Proctor & Redfern in the preparation of the details of this Discussion Paper. The SWEAP Technical Group, which included Metro staff, legal counsel, and consultants, provided a useful and necessary "review/advisory panel" function in the preparation of this document.

Key inputs have been the two workshops for Metro Councillors held in July and October 1989. Both workshops provided insights and ideas which were incorporated into the Discussion Paper. Councillors expressed concern at the first workshop about the consideration in the plan of waste reduction and reuse programs. This led to a higher priority being given in these waste management approaches in the development of alternatives. Councillors also pointed out that consideration of a 20-year period for planning was not comprehensive enough, nor would it provide for the innovative planning required to solve Metro's long-term needs. The Discussion Paper includes discussion on the 40-year and longer period.

The comprehensive public participation program which has been organized by Metro has provided another source of views, ideas and direction to the preparation of the Discussion Paper. The Multistakeholder Committee (MSC), the public's core committee made up of representatives of five Advisory Caucuses from five distinct and differing interest groups, addressed several important matters such as the priority of waste management approaches and the philosophy of waste master plan development. Comments received from SWEAP public groups, interested citizens and government agencies also assisted in the preparation of this document.

SOLID WASTE GENERATED AND MANAGED IN METRO

Metro manages solid waste generated within Metro as well as for several jurisdictions located outside of Metro including the Region of Durham and the Region of York. In 1988, approximately 3,294,000 tonnes were managed by Metro as follows:

■ Keele Valley Landfill	2,186,000 tonnes
■ Brock West Landfill	1,042,000 tonnes
■ Commissioners Street Incinerator (Closed-August 1988)	66,000 tonnes
Solid Waste Managed By Metro in 1988	3,294,000 tonnes

Forecasts of solid waste generation for the next twenty years are summarized in the Discussion Paper. The forecasts considered population projections prepared by Metro Planning, and the estimates of the quantity of solid waste generated in 1988 in Metro, which are as follows:

■ Domestic Wastes	917,885 tonnes
■ Commercial and Industrial Wastes	1,716,534 tonnes
Solid Waste Generated in Metro in 1988	2,634,419 tonnes

Preliminary estimates are that approximately 71 million tonnes of solid waste will be generated in Metro over the 20-year period 1991-2010. The work to date has indicated there are proven, as well as pilot and experimental approaches available to Metro for consideration in the development of its waste management system.

Recognizing the complexity and scheduling of the environmental assessment planning and approvals process, Metro must do all it can now to establish programs and implement the construction of new facilities that begin early to deal with the management of solid waste.

THE PRIORITY OF WASTE MANAGEMENT PROGRAMS AND FACILITIES

The approach presented in Discussion Paper 7.1 reflects the input from Metro Councillors, the Multistakeholder Committee and others regarding how waste can and should be managed in the future. The draft waste management policies reflect that input and describes how the development of alternative systems should have full regard for the following approaches listed in their order of priority:

No. 1 - Reduce the quantity of material becoming solid waste
No. 2 - Reuse material for the same purpose
No. 3 - Recycle, including material recovery
No. 4 - Compost
No. 5 - Incinerate with energy recovery/landfill (residues of the above approaches)

CONSIDERATIONS IN THE DEVELOPMENT OF ALTERNATIVE SYSTEMS

It is important to identify differences and assess trade-offs associated with the above priorities. For example, two of the alternative systems presented in this Discussion Paper assume that incineration is preferable to landfill. Therefore, the waste which cannot be managed by higher priority approaches and which is combustible should be managed by incineration rather than landfill. On the other hand, one alternative system does not include incineration and, as a result, up to 45% of waste requiring management was estimated to be landfilled over the 20-year period. A recommendation has not been made in the Discussion Paper regarding the priority of approaches with respect to landfill and incineration. In this regard, public debate should be stimulated by the release of this document and reflected in the solid waste management policies that are considered by Metro Council.

Another important consideration in the development of Metro's solid waste management system could be to use certain facilities for a defined term of less than 40 years. One major intent of Metro's waste management planning is to change the quantity and nature of waste requiring management. The reduction of certain types of waste and the focus on current and environmentally sensible approaches could mean that the possible use of incinerators (and landfills) would change over the planning period. It is entirely possible then, that incineration, at least for certain materials such as wood and tires, would be utilized for a limited period until other approaches become available or until combustible wastes can be better managed by other means.

Public attitudes and provincial and Metro objectives simply will not allow a landfill-dependent or landfill-dominated waste management system no matter how safe and economic the landfills selected are. The siting and establishment of landfills and energy from waste (EFW) incineration facilities will be extremely difficult. Their implementation could be facilitated if there were a demonstrated commitment by Metro to assume a leadership role among Ontario municipalities in the implementation of waste reduction and reuse programs. Metro could also sponsor research and development in new ways to reuse wastes. Such Metro initiatives could be essential in order for Metro to receive approvals at the earliest possible time.

THE PLANNING AND IMPLEMENTATION PROCESS

A necessary part of addressing the waste management problem is to fully satisfy the requirements of the Environmental Assessment Act (EAA). This requires that every step of the planning process, including the rationale for all decisions, be fully documented. Metro's SWEAP process has recognized these commitments and a comprehensive program of study and documentation has been outlined. The planning process, which was described in the "Appraisal Study", has been, and will be, refined as public consultation develops and the necessary technical studies are completed.

BEYOND THE TWENTY YEAR PLANNING PERIOD

Metro's waste management planning process is not limited to addressing the current problem. Rather, it is intended to consider beyond the 20 to 25-year planning period and examine the objectives and priorities that will shape the long-term approach to managing solid waste. The Discussion Paper begins the development of the long-term approach by outlining seven objectives for review and consideration. The philosophical basis of the objectives is one of a conserver society. In this context, the long-term objectives are as follows:

- the establishment of solid waste management programs and facilities by Metro that follow the guiding principle of sustainable development. This will require Metro to critically evaluate all activities within its jurisdiction (and perhaps beyond) that contribute to the generation of waste, to ensure that the needs of the present are met without compromising the ability of Metro's future generations to meet their own needs,

- the development of a conservation strategy that emphasizes resource conservation and resource enhancement,

- the establishment of long-term programs and facilities that contribute to the evolution of a zero or near-zero waste society. The effects of waste reduction and ecologically sustainable approaches to waste management should result in the greatly extended use of materials, energy and reusable residuals,

- the encouragement by Metro through implementation of these stated long-term objectives, of programs, initiatives and emerging technologies that assist Metro in reaching its objectives. Metro's direct support for research and development, pilot programs and reasonable experimentation should serve to assist in the development of programs and technologies necessary to address the principles outlined herein,

- the development of opportunities for all sectors of society to participate in the long-term waste management planning process. Metro should sponsor and actively encourage, through public awareness and education, these opportunities for participation,

- the establishment of solid waste management facilities in the relatively short 20-year period which recognize and consider the longer term objectives. This includes emphasis on waste reduction as the primary method of waste management and the eventual elimination of incineration and landfill as approaches to managing Metro's waste, and

- the development by Metro of "net materials accountability" whereby industrial manufacturers of material are charged with the responsibility of ensuring that production practices result in the least quantity of waste possible being generated.

WASTE MANAGEMENT SYSTEM COMPONENTS

There are many different types of programs and technologies (e.g., system components) potentially available to manage Metro's solid waste. Discussion Paper 7.1 and earlier SWEAP Discussion Papers describe these various system components. In developing alternative systems, the following types of approaches were considered:

1. Reduction & Reuse (not requiring direct management by Metro)

   - Reduction by:
     - public education*
     - packaging changes
     - backyard composting*
     - procurement policies*
     - incentives
     - industrial in-house changes

* Metro is currently actively involved in these

- Reuse, including:
  - changes in household practices
  - commercial and industrial audits
  - container deposits

2. Recycling (requiring direct management by Metro)

- Recycling, including:
  - material sorting facilities
  - blue box program
  - wet/dry collection
- Composting, including:
  - leaf composting
  - dedicated organic waste composting
  - wet waste composting
  - mixed waste composting

3. Disposal (requiring direct management by Metro)

- Incineration, including:
  - with energy recovery
  - mixed waste feed
  - feed restricted to combustible residuals from higher priority approaches
  - production of RDF
  - residuals used as fuel
- Landfill, including:
  - mixed waste
  - restricted to residuals from higher priority approaches
  - restricted use

DEVELOPMENT OF ALTERNATIVE WASTE MANAGEMENT SYSTEMS

The product of Discussion Paper No. 7.1 is the identification of three "Alternative" waste management systems which describe different combinations of programs and facilities (i.e., system components) that can be used to manage solid waste generated in Metro. The three alternatives were developed having regard for the following considerations:

- the quantity and type of solid waste requiring management for the next 20 to 40 years,
- the priorities and guiding principles established by Metro Council, identified by the Province and suggested through the SWEAP public consultation process,
- Metro and Provincial waste diversion objectives. Provincial objectives will require that by 1992, 25% and by the year 2000, 50% of total waste generated be diverted from landfill and incineration Metro has endorsed a landfill diversion objective of 30% by 1992,
- the types of waste management programs and technologies potentially available to develop Metro's long-term system. The list of potential approaches includes some which have yet to be proven at a Metro size and scale,
- "system screening factors" which were used to develop a long list of potential systems, and
- "system comparative factors" which were used to evaluate alternatives from the long list of potential systems.

Discussion Paper No. 7.1 also includes a list of factors that could be used to develop criteria, that in turn could be used to evaluate specific waste management programs and technologies considered for implementation by Metro.

THE THREE ALTERNATIVE SYSTEMS

Two of three alternatives presented include incineration (energy from waste - EFW) and all three were developed to ensure that the effect of waste reduction programs was maximized.

A comparison of the three alternative systems, using the year 2000 as an example, is provided in **Table 1** and the attached graphic **Figure 1**. The alternative systems are:

- Alternative System No. 1 - high diversion without EFW
- Alternative System No. 2 - high diversion with moderate EFW
- Alternative System No. 3 - moderate diversion with high EFW

The evaluation and selection of Metro's preferred waste management system will follow the public and government agency review of Discussion Paper No. 7.1.

THE NEXT STEPS

The next steps in the SWEAP process require a significant commitment from Metro. The following steps are outlined in Discussion Paper No. 7.1 as initiatives that Metro should undertake as part of the SWEAP planning and implementation process:

- Metro should continue with, and expand where necessary, the Public Participation Program including public education,

- the SWEAP Technical Group should continue to co-ordinate all activities directed to establishing waste management programs and facilities. It should be the task of this Group to ensure that the long-term waste management system is developed in an orderly and rational manner,

- Metro should consider, modify if necessary, and approve Solid Waste Management Policies. Draft policies were provided by the Commissioner of Works to Works Committee in January 1989. Those policies are extremely important to developing a master plan and would represent Metro Council's statement on waste management,

- the site search process for the proposed new 190 TPD prototype compost facility and for additional compost facilities should be completed. It is essential that Metro begin to establish this type of facility as part of its system development process,

- the waste composition study should be continued. Available secondary data have been adequate only to assist generally in the planning of systems and a possible range of facility sizes,

- a site selection approach, and evaluation criteria to find preferred locations for recycling, composting and energy-from-waste (EFW) facilities, should be finalized for review by the public and Metro Council. Following this, the facility site searches should be completed. This work should be in full swing by mid-1990,

- the prototype materials recovery facility should be established and a site search begun to identify locations for future materials recovery facilities,

- the role (e.g., numbers, size, type) of landfill in Metro's long-term system should be examined. This is an important part of the landfill site selection and system development process,

- Metro's long-term landfill site search process should continue and one or more landfills should be established, and

- Metro should continue with proposed pilot wet collection program.

RECOMMENDATION

It is recommended that Discussion Paper No. 7.1 be distributed for public and government agency review and then be subject to a further review through technical/planning sessions with Metro Council.

TABLE 1
A COMPARISON OF ALTERNATIVE SYSTEMS
BY PERCENTAGE OF TOTAL WASTE HANDLED
(YEAR 2000)

System Component	Alternative No. 1	Alternative No. 2	Alternative No. 3
REDUCTION AND REUSE - Public Education - Packaging Reduction - Industrial In-House Changes - Backyard Composting - Procurement Policy - Incentives - Container Deposits	14%	14%	14%
RECYCLING - Blue Box - Separate Collections - Industrial Audits	25%	25%	19%
COMPOSTING - Leaf - Dedicated - Wet/Dry - Mixed	13%	13%	10%
OTHER - Sewage Sludge - Tire and Wood Waste as fuel	5%	6%	6%
ENERGY FROM WASTE	0%	24%	32%
LANDFILL	42%	18%	19%
Total	**100%**	**100%**	**100%**

Alternative System No. 1 - high diversion without EFW
Alternative System No. 2 - high diversion with moderate EFW
Alternative System No. 3 - moderate diversion with high EFW

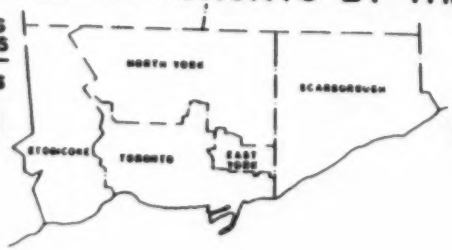
ALTERNATIVE WASTE MANAGEMENT STRATEGIES FOR METROPOLITAN TORONTO BY THE YEAR 2000

FIGURE 1

1989

DOMESTIC WASTE - 955,000 TONNES
INDUSTRIAL / COMMERCIAL - 1,789,000 TONNES
TOTAL - 2,744,000 TONNES

CURRENT WASTE GENERATION AND WASTE MANAGEMENT APPROACH



"BLUE BOX" RECYCLING 2%

LEAF COMPOSTING 1%

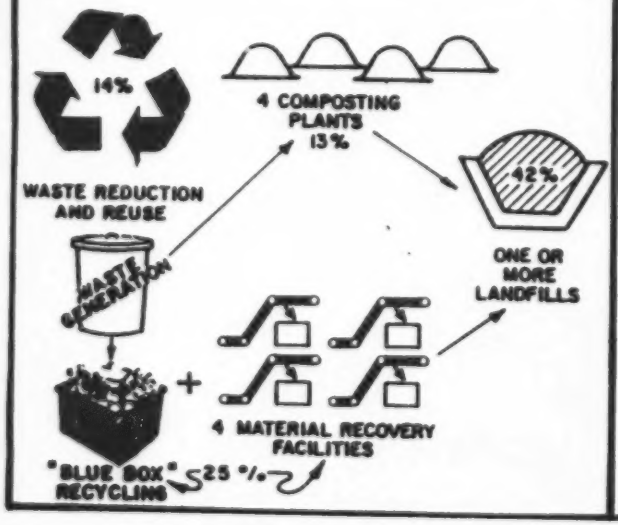
WASTE EXPORT TO LANDFILL 4.5%

KEELE VALLEY AND BROCK WEST LANDFILL 92.5%

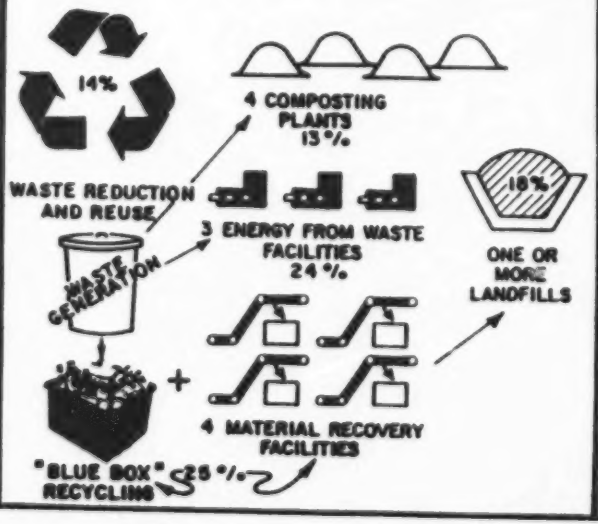
ESTIMATED WASTE GENERATION FOR 20 YEARS

71,000,000 TONNES
OR
3,500,000 TONNES ANNUALLY

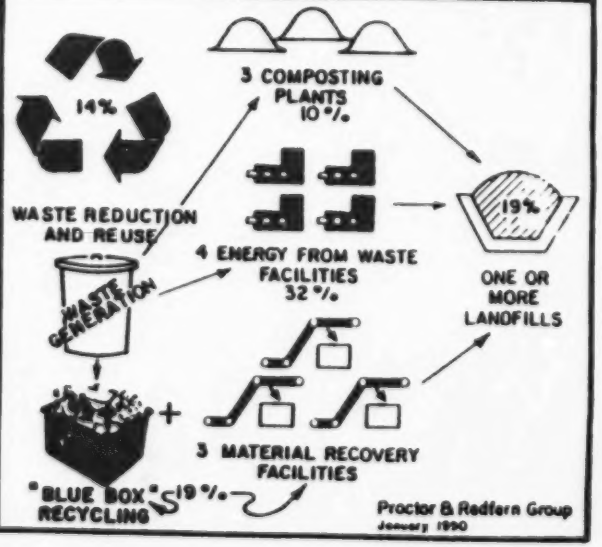
ALTERNATE SYSTEM No.1
HIGH DIVERSION WITHOUT E F W



ALTERNATE SYSTEM No.2
HIGH DIVERSION WITH MODERATE E F W



ALTERNATE SYSTEM No.3
MODERATE DIVERSION WITH HIGH E F W



Proctor & Redfern Group
January 1990